PIONEER

Service Manual

CIRCUIT DESCRIPTIONS
REPAIR & ADJUSTMENTS

ORDER NO.
ARP-809-0

DYNAMIC EXPANDER

EX-9000[BK]
EX-9000

- Model EX-9000 come in two colors design, black and silver.
- Models EX-9000[BK] (black) and EX-9000 (Silver) come in Five Versions destinguished as follows:

Type	Applicable model		Power requirement	Destination
	EX-9000(BK)	EX-9000		
KU	O	—	AC 120V only	U.S.A.
S	O	O	AC110V, 120V, 220V, 240V (Switchable)	General export
S/G	O	—	AC110V, 120V, 220V, 240V (Switchable)	U.S Military
HEM	O	O	AC220V (240V) ※	European continent
HB	O	O	AC240V (220V) ※	United Kingdom

※ Change the primary wirning of the power transformer.

- This service manual is applicable to the KU, S and S/G types. As to the S and S/G types, please refer to page 23.
- As to the HEM and HB types, please refer to the additional service manual (ARP-810).

CONTENTS

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1. SPECIFICATIONS

Processor Section

Dynamic Expansion
HIGH (5 kHz)
MID (500 Hz)
LOW (50 Hz)

Item \ Band	LOW	MID	HIGH
Dynamic Expansion	17 dB	12 dB	17 dB
Upward Expansion	+15 dB	+7 dB	+12 dB
Downward Compression	−2 dB	−5 dB	−5 dB

Impulse Response
Attack Time . . . . . 4.7 m sec.
Release Time . . . . . HARD position; 68 m sec.
SOFT position; 2.7 sec.
Maximum Output Voltage
(Expansion Level VR. ALL MAX)
50 Hz, T.H.D.: 0.8 %, RL: 50 kΩ . . . . . 7.0 V
500 Hz, T.H.D.: 0.8 %, RL: 50 kΩ . . . . . 7.5 V
5 kHz, T.H.D.: 0.8 %, RL: 50 kΩ . . . . . 5.5 V
Input Impedance
EXPANDER INPUT . . . . . 50 kΩ
TAPE PLAY . . . . . 50 kΩ
Output Impedance (1 kHz)
EXPANDER OUTPUT . . . . . 1 kΩ
Signal to Noise Ratio
(IHF A, Short-circuited, 1 kHz,
Expansion Level
VR. ALL MAX) . . . . . 96 dB (at 1 V output)
Gain . . . . . 0 dB

Power Supply Section/Miscellaneous

Power Requirements
KU model . . . . . AC120 V, 60 Hz
S,S/G models . . . . . .
~ AC 110 V/120 V/220 V/240 V switchable, 50/60 Hz
HB model . . . . . a.c. 240 volts ~, 50/60 Hz
HEM model . . . . . a.c. 220 volts ~, 50/60 Hz
Power Consumption . . . . . 28 W
AC outlet . . . . . Unswitched 100 W MAX
Dimensions . . . . . 420 (W) x 60 (H) x 212 (D) mm
16-9/16 (W) x 2-3/8 (H) x 8-3/8 (D) in
Weight . . . . . 3.2 kg (7 lb 1 oz)

Furnished Parts

Connection cords with pin plugs 2
Operating Instructions 1

NOTE:
Specifications and design subject to possible modification without notice due to improvements

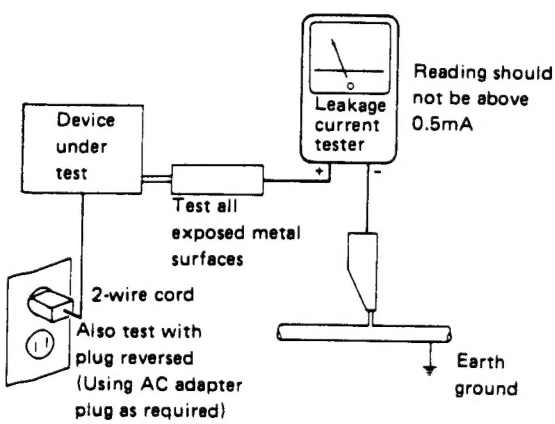
2. SAFETY INFORMATIONS

1. SAFETY PRECAUTIONS

The following check should be performed for the continued protection of the customer and service technician.

LEAKAGE CURRENT CHECK

Measure leakage current to a known earth ground (water pipe, conduit, etc.) by connecting a leakage current tester such as Simpson Model 229-2 or equivalent between the earth ground and all exposed metal parts of the appliance (input/output terminals, screwheads, metal overlays, control shaft, etc.). Plug the AC line cord of the appliance directly into a 120V AC 60Hz outlet and turn the AC power switch on. Any current measured must not exceed 0.5mA.



AC Leakage Test

ANY MEASUREMENTS NOT WITHIN THE LIMITS OUTLINED ABOVE ARE INDICATIVE OF A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED BEFORE RETURNING THE APPLIANCE TO THE CUSTOMER.

2. PRODUCT SAFETY NOTICE

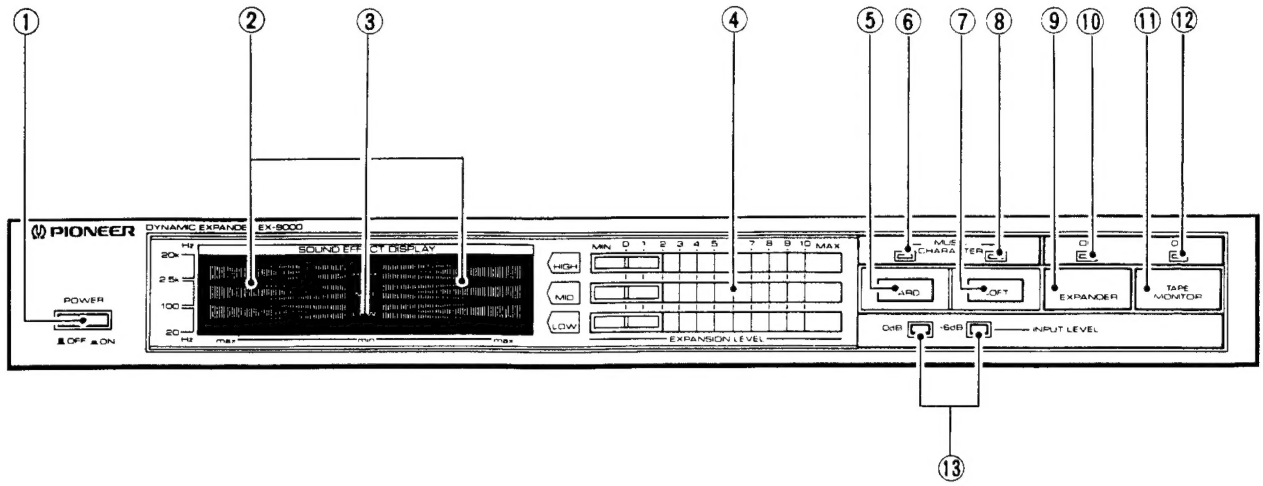
Many electrical and mechanical parts in the appliance have special safety related characteristics. These are often not evident from visual inspection nor the protection afforded by them necessarily can be obtained by using replacement components rated for voltage, wattage, etc. Replacement parts which have these special safety characteristics are identified in this Service Manual.

Electrical components having such features are identified by marking with a ⚠ on the schematics and on the parts list in this Service Manual.

The use of a substitute replacement component which dose not have the same safety characteristics as the PIONEER recommended replacement one, shown in the parts list in this Service Manual, may create shock, fire, or other hazards.

Product Safety is continuously under review and new instructions are issued from time to time. For the latest information, always consult the current PIONEER Service Manual. A subscription to, or additional copies of, PIONEER Service Manual may be obtained at a nominal charge from PIONEER.

3. FRONT PANEL FACILITIES



① POWER switch (■ OFF ▬ ON)

When this switch is set to the ON position, power is supplied to the unit's main circuits.
Disconnect the power cord from the power outlet when you do not plan to use the unit for a long period of time.

② SOUND EFFECT DISPLAY

This DISPLAY indicates the degree of expansion applied to the dynamic range. The three ranges LOW, MID, HIGH are indicated equally to right and left of center with the red and white F.L. tube display.

③ LOW, MID, HIGH indicators

These indicate the division of the frequency spectrum into three bands. When the POWER switch ① is pressed, these indicators light and thus function as power indicators.

④ LOW, MID, HIGH dynamic EXPANSION LEVEL controls

These controls divide the frequency spectrum into the three bands LOW (20 — 100 Hz), MID (100 — 2.5 kHz), and HIGH (2.5 kHz — 20 kHz); as the respective controls are moved toward the right, the dynamic range of the corresponding frequency is emphasized. Set the three controls to the optimum position in accordance with the type of music being played, and your own preferences. When set to the MIN position, the SOUND EFFECT DISPLAY will not move.

⑤ HARD switch

Operates when the EXPANDER switch ⑨ is set to ON. The playback sound will take on a harder edge, with a greater sense of presence.

⑥ HARD indicator (MUSIC CHARACTER)

⑦ SOFT switch

Operates when the EXPANDER switch ⑨ is set to ON. The playback sound will become softer, suitable for easy listening.

⑧ SOFT indicator (MUSIC CHARACTER)

⑨ EXPANDER switch

When this switch is pressed, expansion effect is added to the signals input to the EXPANDER INPUT terminals. The indicator ⑩ will light, and the SOUND EFFECT DISPLAY will operate. When set to OFF, the SOUND EFFECT DISPLAY ② and indicators ⑥ and ⑧ will not light, even if the HARD or SOFT switch (⑤ or ⑦) is pressed. In the OFF position, the expansion circuitry is disconnected, so a check can be performed of the degree of expansion effect by turning the switch on and off.

⑩ EXPANDER indicator

Lights when the EXPANDER switch is turned ON.

⑪ TAPE MONITOR switch

Press when playing back tapes or performing recording monitoring on the tape deck connected to the rear panel terminals. When you wish to add expansion effects to the tape's playback sound, press this switch and the EXPANDER switch ⑨.

⑫ TAPE MONITOR indicator

Lights when the TAPE MONITOR switch is set to ON.

⑬ INPUT LEVEL selector (0 dB, −6 dB)

Set in accordance with the input level of the input music source.

NOTES:

- *When the POWER switch is OFF, no signals will be output from the OUT terminals, regardless of the EXPANDER switch.*
- *When the TAPE MONITOR switch is ON, no expansion effect will be output from the TAPE REC terminals.*

4. PARTS LOCATION

NOTES:

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.*
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Front Panel View

Front panel assembly
ANE-947 (Black)
ANY-076 (Silver)

Power knob (POWER)
AAY-155 (Black)
AAY-231 (Silver)

Slide knob (EXPANTION LEVEL)
AAY-134

Bonnet case
ANE-540 (Black)
ANE-585 (Silver)

Knob D (HARD)
AAY-153

Knob C (SOFT)
AAY-152

Knob A (TAPE MONITOR)
AAY-150

Knob B (EXPANDER)
AAY-151

Push knob E (INPUT LEVEL)
AAY-154

Rear Panel View

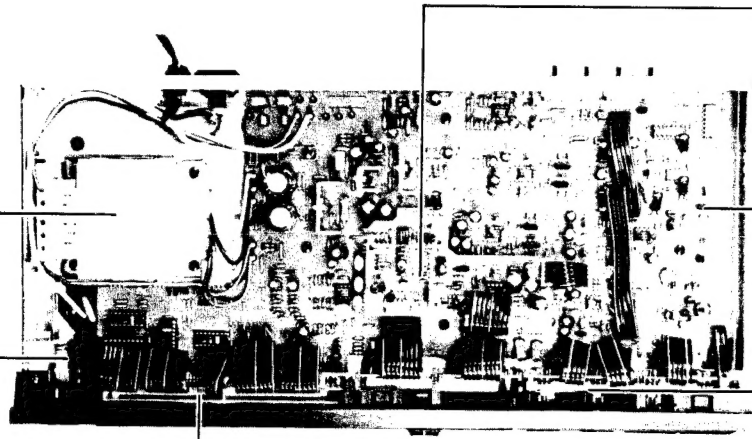
Terminal (4P)
(IN, OUT, TAPE)
AKB-094

⚠ AC socket (AC OUTLET)
AKP-506

Rear panel

⚠ AC power cord
ADG-073

Top View



⚠ ★Power transformer
(T1,120V)
ATS-209

⚠ ★★Push switch
(S3, POWER)
ASG-551

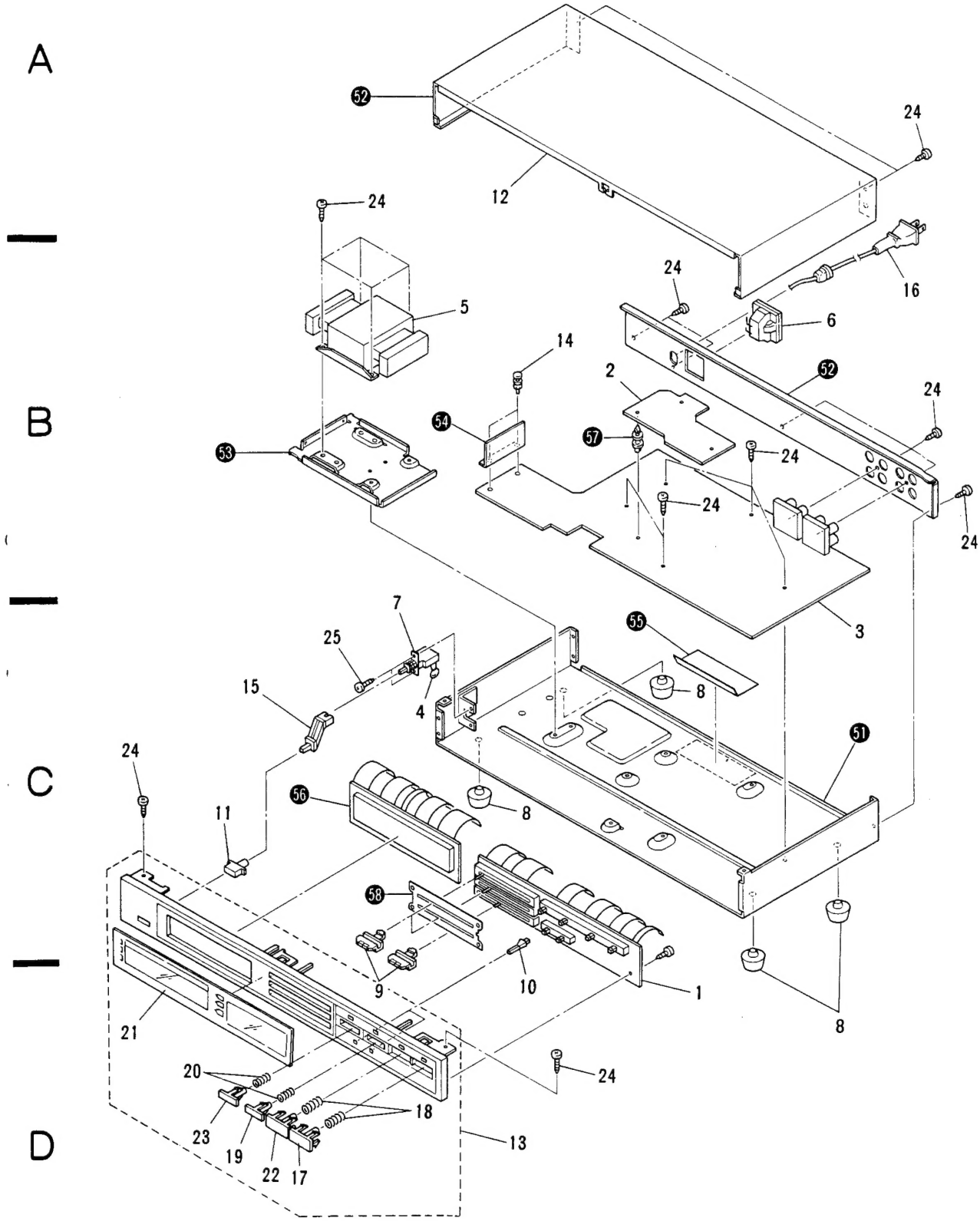
FL assembly

AF assembly
GWK-261

Complex assembly
GWM-416

Control assembly
GWG-198

5. EXPLODED VIEW



NOTES:

- ***Parts without part number cannot be supplied.***
- ***The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.***
- ***For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★.***
  ★★ GENERALLY MOVES FASTER THAN ★
  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Parts List (EX-9000 [BK])

Mark	No.	Part No.	Description
	1	GWG-198	Control assembly
	2	GWK-261	AF assembly
	3	GWM-416	Complex assembly
⚠	4	ACG-502	Ceramic capacitor (C600) (0.01/125V)
⚠ ★	5	ATS-209	Power transformer (T1, 120V)
⚠	6	AKP-506	AC socket (AC OUTLET)
⚠ ★★	7	ASG-551	Push switch (S3, POWER)
	8	AEP-016	Leg assembly
	9	AAY-134	Slide knob (EXPANTION LEVEL)
	10	AAY-154	Push knob E (INPUT LEVEL)
	11	AAY-155	Power knob (POWER)
	12	ANE-540	Bonnet case
	13	ANE-947	Front panel assembly
	14	AEC-525	Nylon rivet
	15	ANR-879	Push lod
⚠	16	ADG-073	AC power cord
	17	AAY-150	Knob A (TAPE MONITOR)
	18	ABH-095	Coil spring
	19	AAY-152	Knob C (SOFT)
	20	ABH-099	Coil spring
	21	ANZ-024	Display panel
	22	AAY-151	Knob B (EXPANDER)
	23	AAY-153	Knob D (HARD)
	24	BBZ30P080FZK	Screw 3x8
	25	VMZ30P060FMC	Screw 3x6
	51		Chassis
	52		Rear panel
	53		Transformer stay
	54		Barrier A
	55		Barrier B
	56		FL assembly
	57		P.C. B holder
	58		Blind sheet

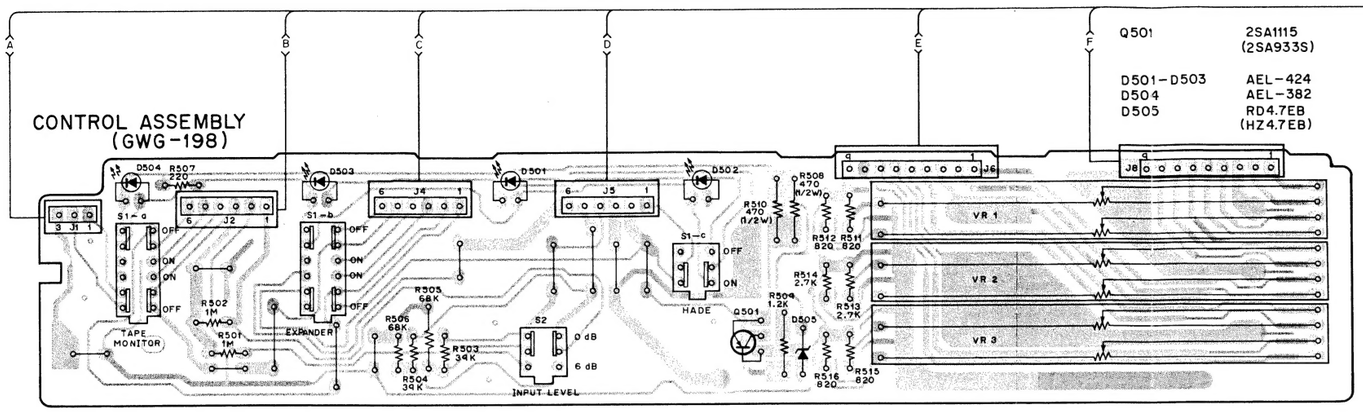
Contrast of EX-9000(BK) and EX-9000

Mark	Description	Part No.		Remarks
		EX-9000(BK) type	EX-9000 type	
	Front panel assembly	※ ANM-947	ANY-076	
	Bonnet case	※ ANE-540	ANE-585	
	Power knob (POWER)	※ AAY-155	AAY-231	

Note: ※ is black type.

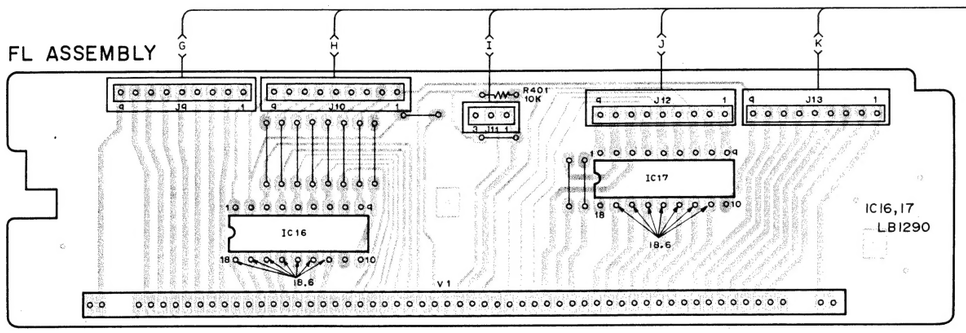
6. P.C. BOARDS CONNECTION DIAGRAM

CONTROL ASSEMBLY (GWG-198)



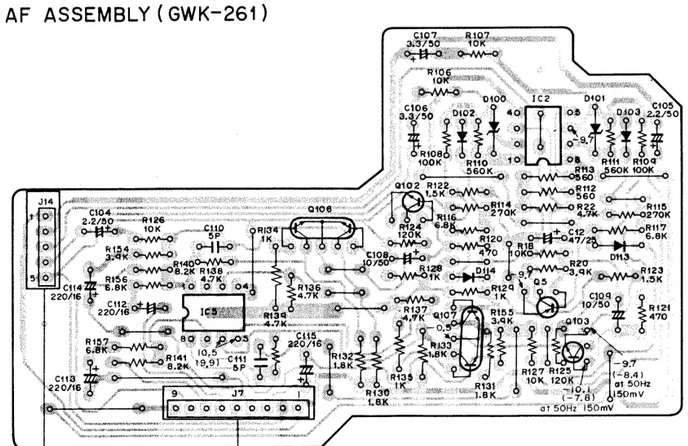
Q501	2SA1115 (2SA933S)
D501–D503	AEL-424
D504	AEL-382
D505	RD4.7EB (HZ4.7EB)

FL ASSEMBLY



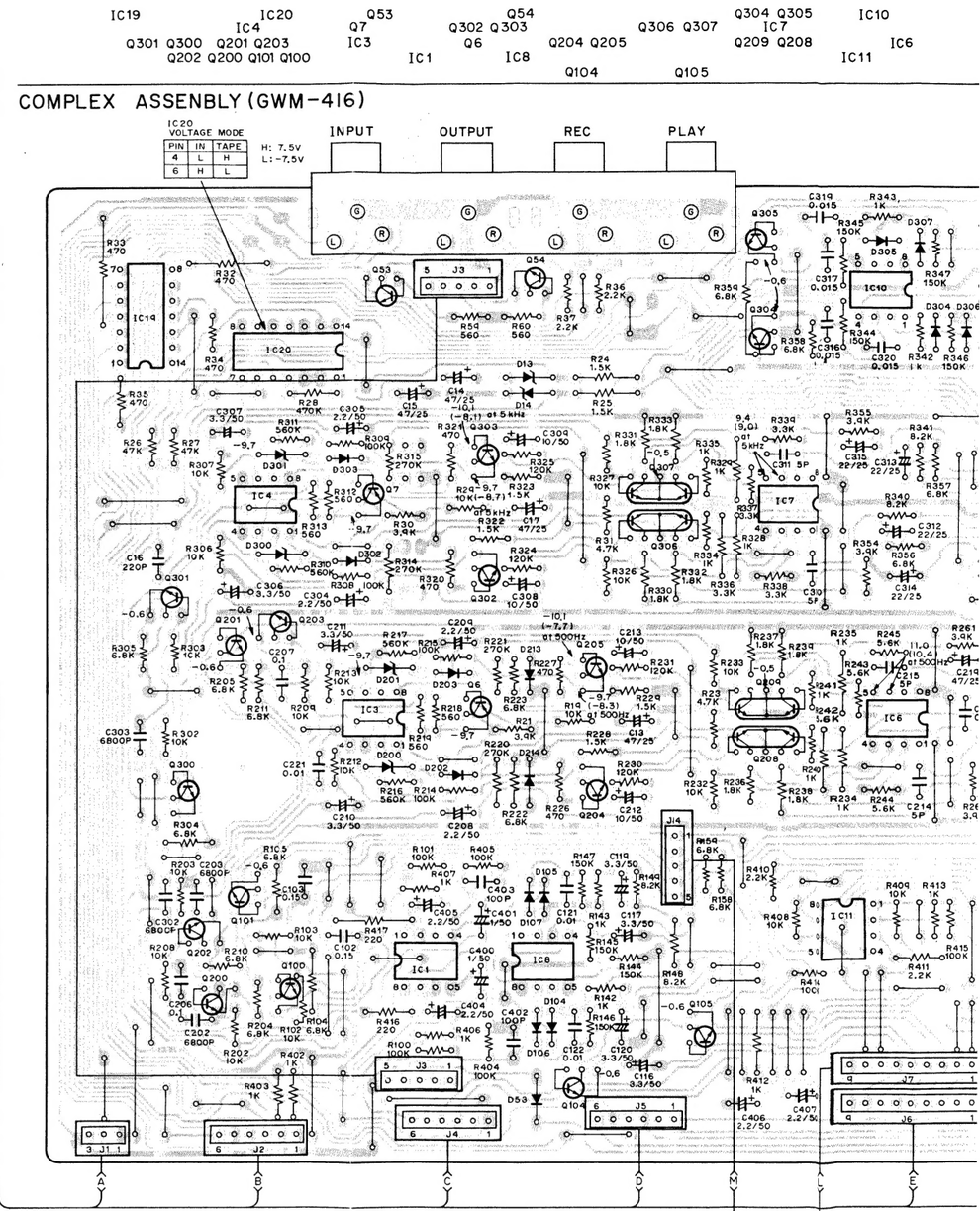
IC1, IC3, IC4, IC6–IC11	NJM4558DXC
IC13–IC15	HA12010
IC18	LB1290
IC19	TC4066BP
IC20	TC4069UBP
Q1	2SB750A
Q2–Q4	2SD836A
Q6, Q7, Q51	2SA1115 (2SA933S)
Q50, Q52, Q104, Q105, Q206, Q207, Q304, Q305	2SC2603 (2SC1740S)
Q53, Q54, Q108, Q210, Q308	2SC2878
Q100, Q101, Q200–Q205, Q300–Q303	2SC1845
Q208, Q209, Q306, Q307	2SC2259
D1, D2	1S2471
D3, D4, D5, D6	S5566
D7	RD22EB (HZ22EB)
D8	RD16EB (HZ16EB)
D9, D10	RD9.1EB (HZ9.1EB)
D11, D12, D50, D52, D53, D104–D112, D202–D214, D302–D312	1SS131
D13, D14	RD7.5EB (HZ7.5EB)
D51	KZL083
D200, D201, D300, D301	RD10EB (HZ10EB)

AF ASSEMBLY (GWK-261)

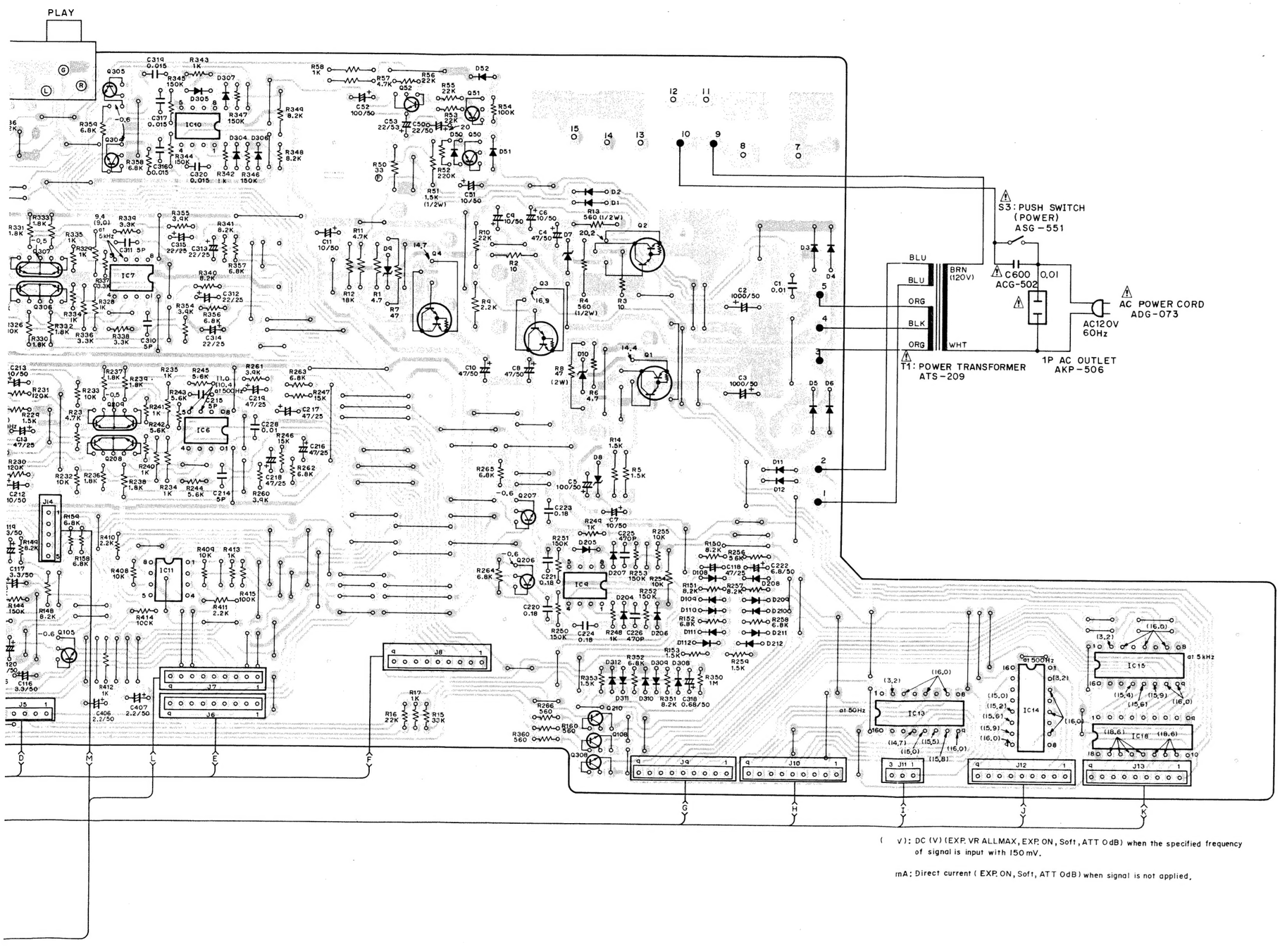


IC2, IC5	NJM4558DXC
Q5	2SA1115 (2SA933S)
Q102, Q103	2SC1845
Q106, Q107	2SC2259
D100, D101	RD10EB (HZ10EB)
D102, D103, D113, D114	1SS131

COMPLEX ASSENBLY (GWM-416)



Q306 Q307 Q304 Q305 IC10 Q52 Q4 Q50 Q51 Q3 Q2
IC7 Q207 Q1
Q209 Q208 IC6 Q206
IC11 IC9
Q105 Q308 Q108 Q210 IC13 IC14 IC15 IC18

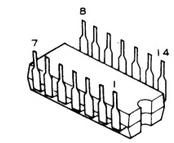


(V): DC (V) (EXP. VR ALL MAX, EXP. ON, Soft, ATT 0dB) when the specified frequency of signal is input with 150 mV.

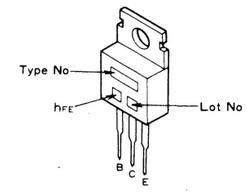
mA: Direct current (EXP. ON, Soft, ATT 0dB) when signal is not applied.

External Appearance of Transistor and ICs

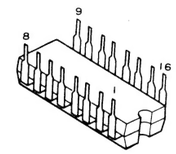
TC4066BP
TC4069UBP



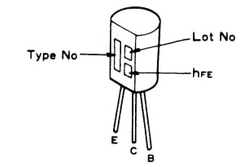
2SB750A
2SD836A



HA12010

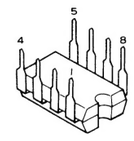


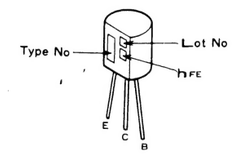
2SC1845



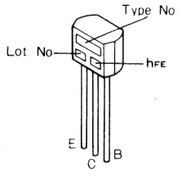
NJM4558DXC

2SC2878

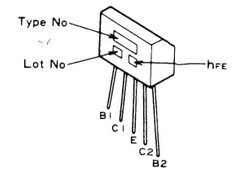




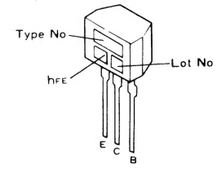
2SA1115
2SC2603



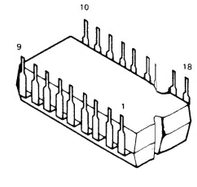
2SC2259



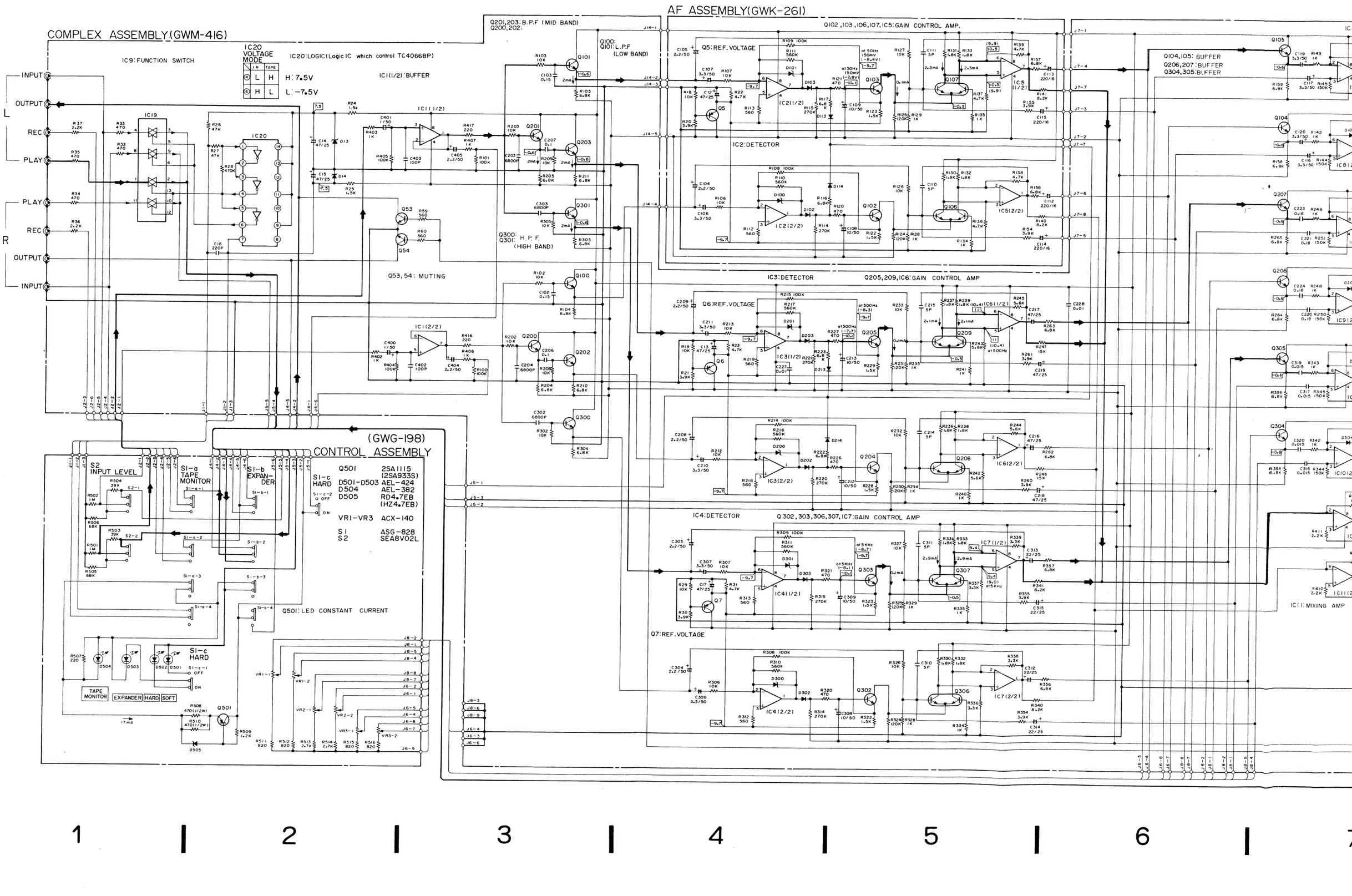
2SA933S
2SC1740S



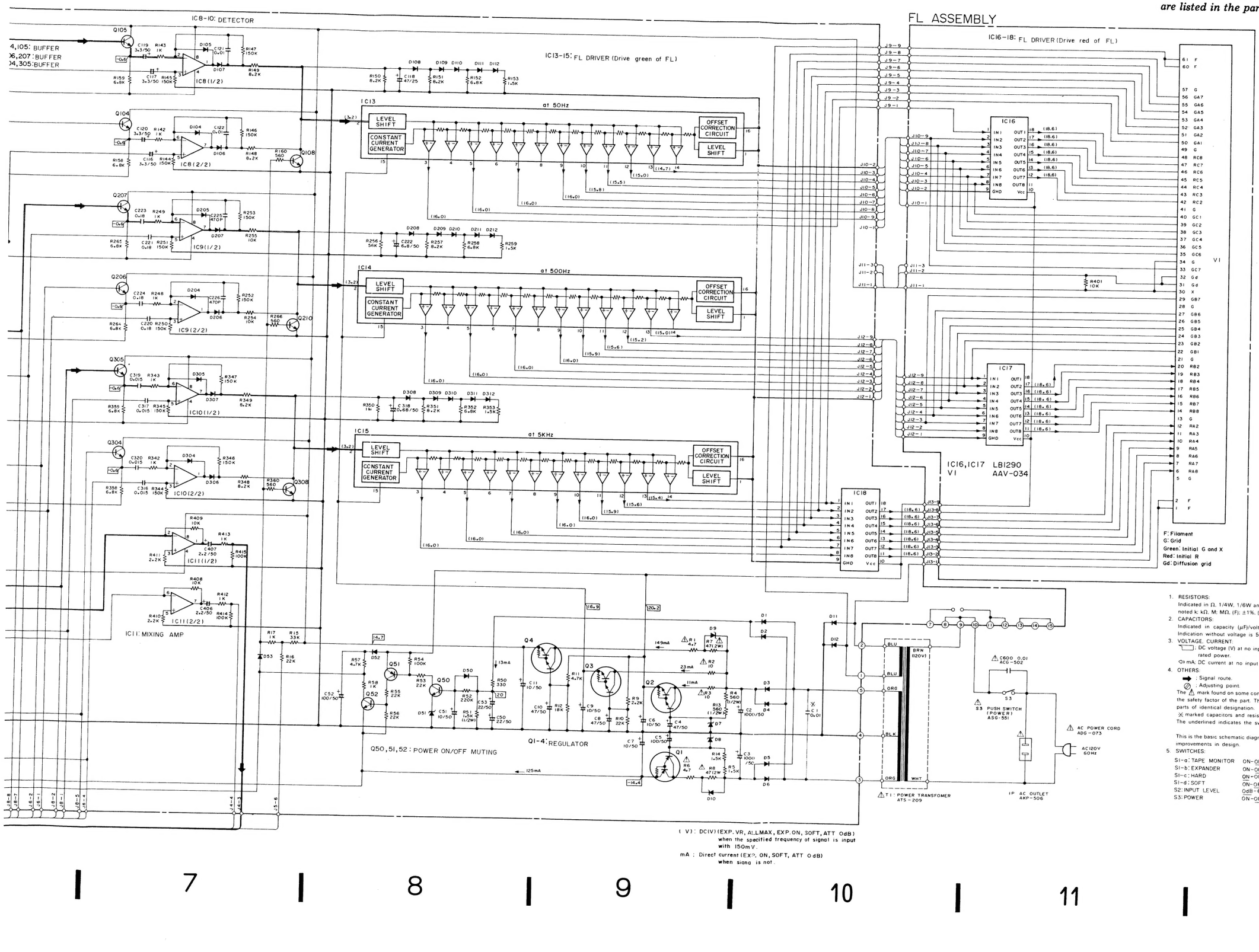
LB1290



7. SCHEMATIC DIAGRAM



NOTE:
The indicated semiconductors are representative ones only. Other alternative semiconductors may be used and are listed in the parts list.



(V): DC(V) (EXP. VR, ALL MAX, EXP. ON, SOFT, ATT 0dB) when the specified frequency of signal is input with 150mV.

mA: Direct current (EXP, ON, SOFT, ATT 0dB) when signal is not.

COMPLEX ASSEMBLY

IC1, IC3, IC4, IC6–IC11	NJM45580XC
IC13–IC15	HAI2010
IC18	LB1290
IC19	TC4066BP
IC20	TC4069UBP
Q1	2SB750A
Q2–Q4	2SD836A
Q6, Q7, Q51	2SA1115A (2SA933S)
Q50, Q52, Q104, Q105, Q206, Q207, Q304, Q305	2SC2603 (2SC1740S)
Q53, Q54, Q108, Q210, Q308	2SC2878
Q100, Q200–Q205, Q101, Q300–Q303	2SC1845
Q208, Q209, Q306, Q307	2SC2259
D1, D2	1S2471
D3–D6	S5566
D7	RD22EB (HZ22EB)
D8	RD16EB (HZ16EB)
D9, D10	RD9.1EB (HZ9.1EB)
D11, D12, D50, D52, D53, D104–D112, D202–D214, D302–D312	1SS131
D13, D14	RD7.5EB (HZ7.5EB)
D51	KZL083
D200, D201, D300, D301	RD10EB (HZ10EB)
C1	ACG-019

AF ASSEMBLY

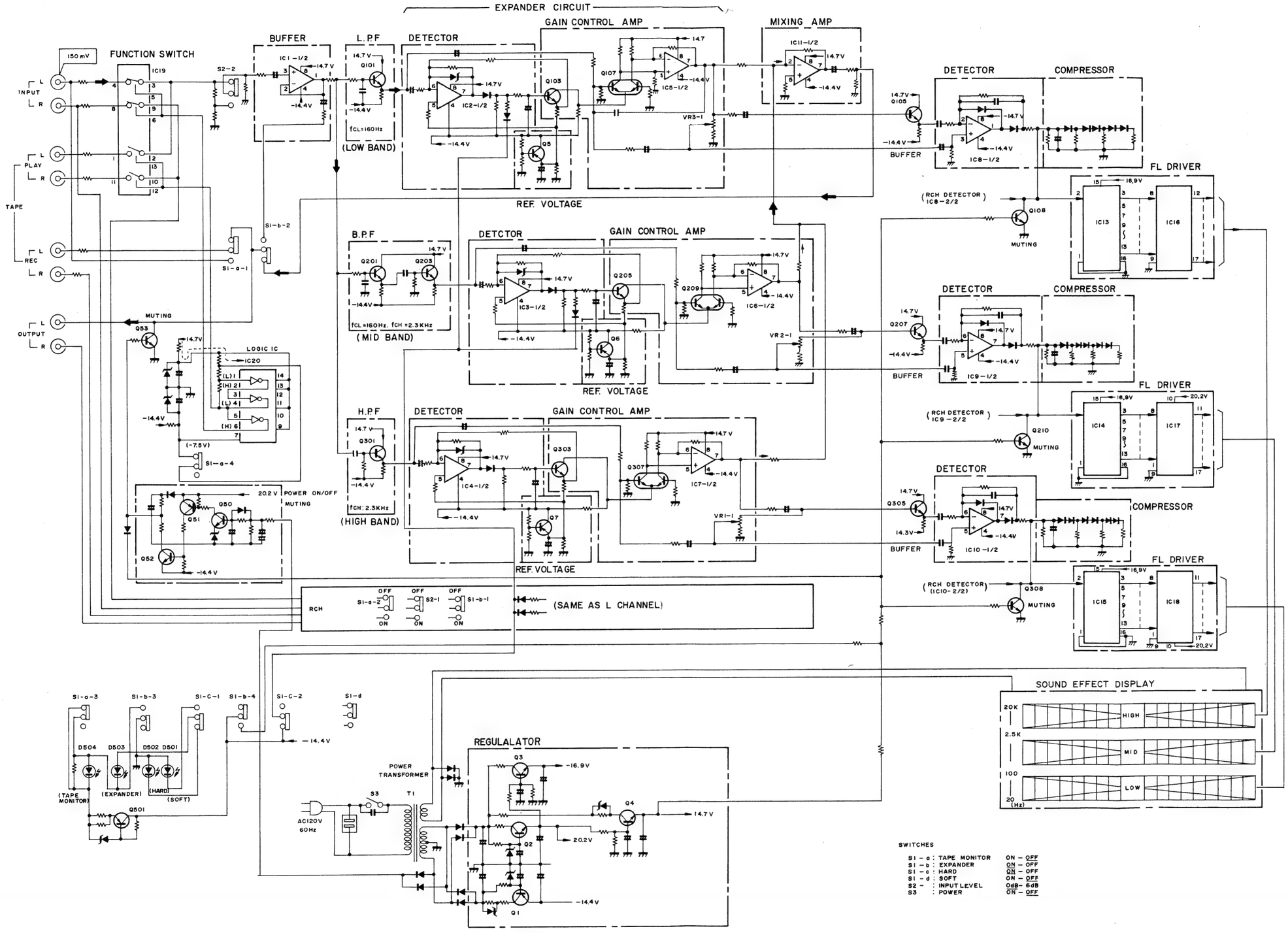
IC2, IC5	NJM4558DXC
Q5	2SA1115 (2SA933S)
Q102, Q103 Q106, Q107	2SC1845 2SC2259
D100, D101	RD10EB (HZ10EB)
D102, D103, D113, D114	1SS131

1. RESISTORS:
   Indicated in Ω, 1/4W, 1/6W and 1/8W, ±5% tolerance unless otherwise noted k: kΩ, M: MΩ, (F): ±1%, (G): ±2%, (K): ±10%, (M): ±20% tolerance
2. CAPACITORS:
   Indicated in capacity (μF)/voltage (V) unless otherwise noted p: pF. Indication without voltage is 50V except electrolytic capacitor.
3. VOLTAGE, CURRENT:
   □: DC voltage (V) at no input signal Value in ( ) is DC voltage at rated power.
   ⇦ mA: DC current at no input signal
4. OTHERS:
   ➡: Signal route.
   ⊘: Adjusting point.
   The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.
   ※ marked capacitors and resistors have parts unmbers.
   The underlined indicates the switch position.

   This is the basic schematic diagram, but the actual circuit may vary due to improvements in design.
5. SWITCHES:

S1-a: TAPE MONITOR	ON-OFF
S1-b: EXPANDER	ON-OFF
S1-c: HARD	ON-OFF
S1-d: SOFT	ON-OFF
S2: INPUT LEVEL	0dB-6dB
S3: POWER	ON-OFF

8. BLOCK DIAGRAM



SWITCHES

S1 – a	: TAPE MONITOR	ON – OFF
S1 – b	: EXPANDER	ON – OFF
S1 – c	: HARD	ON – OFF
S1 – d	: SOFT	ON – OFF
S2 –	: INPUT LEVEL	0dB– 6dB
S3	: POWER	ON – OFF

9. CIR

The EX-90
hall presence
by expandin
sound progra

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detecting circ
and a mixin
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tube, etc.

Fig. 9-1
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increased in
the dynamic

Output signal
(envelope)

Fig. 9-

9. CIRCUIT DESCRIPTIONS

The EX-9000 is an adaptor which is used to reproduce hall presence live sounds and powerful dynamic sounds by expanding the dynamic range of various kinds of sound program souces.

The circuit is comprised of a buffer amplifier, a filtering circuit (it enables to divide the audio frequencies into 3 bands; namely, HIGH, MID and LOW bands), a detecting circuit, a gain controlling amplifier (G.C.A.), and a mixing circuit. It is also comprised of a driving circuit which is used to actuate the fluorescent indicator tube, etc.

Fig. 9-1 shows the characteristics of the level compression and expansion of the dynamic expansion operation. If the voltage to be input to the expanding circuit (It is comprised of a detecting circuit, a reference voltage circuit and a gain controlling amplifier.) is lower than that of the specified level, the gain of the circuit is becoming attenuated in a constant rate. If the input level becomes higher than the specified level, the gain is increased in proportion to the increasing amount, and the dynamic range is also expanded.

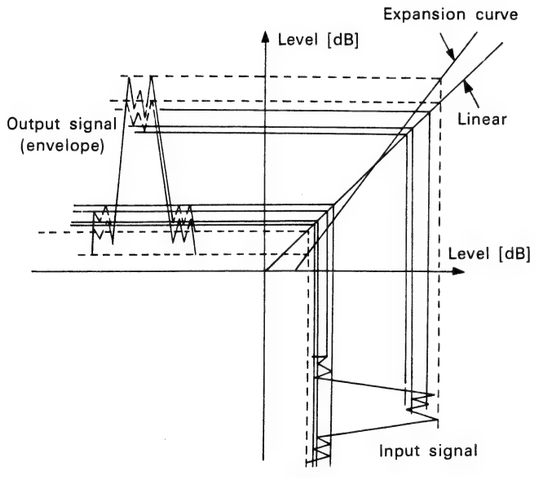


Fig. 9-1 Operation of dynamic expansion

■ Filter circuit

The input signal passed through the buffer amplifier is divided into 3 bands; namely, low band (low-pass filter, f_{CL}=106 Hz), middle band (band-pass filter, f_{CL}=160 Hz and f_{CH}=2.3 kHz) and high band (high-pass filter, f_{CH}=2.3 kHz).

■ Detecting circuit

The signal has been divided into 3 bands by the filter is detected by the individual half-wave rectifying circuits to generate DC current to be used to control the gain of the gain control amplifier. (Fig. 9-2)

1. As the zener diode D1 becomes into a conductive state when the positive side of the audio signal is input to R1, after going through the filter, the output Ⓐ point of the differential amplifier IC1 becomes almost zero alternating currently, and the controlling current of the gain controlling amplifier becomes $I_{ab}=I_b$.
   In turn, in the negative side of the audio signal, as the zener diode D1 becomes into a non-conductive state, the input signal is reversed to an output signal by the amplitude difference ratio between R1 and R2, and it is rectified by D2. The rectified alternating current signal is smoothed by R5 and C1, and thus the DC current can be obtained. At this point, the controlling current of the G.C.A. circuit becomes $I_{ab}=I_a+I_b$.
2. In the state S1 (hard switch) is turned off, the current which has been charged to C1 is discharged through R6 (R5<R6). When R6 is sufficiently large, the discharge time constant C1R6 becomes large (the fall time of the DC voltage becomes long). This is called as soft position.
3. In the state S1 is turned on, the currnet which has been charged to C1 is discharged through R7 (R7<R6, R5<R7).
   The discharge time constant C1R7 becomes smaller than that of aforementioned soft position (the fall time of DC voltage becomes short). This is called as hard position.
4. By varying the fall time of DC voltage, the following effects can be obtained.
   Hard position: When the fall time of DC voltage is shortened, the sound becomes full of lively tone. (This corresponds to a music of high tempo.)
   Soft position: When the fall time of DC voltage is elongated the sound becomes massive tone. (This corresponds to a music of slow tempo.)
   The effects of soft/hard can be applied only to the low and middle bands.

■ Gain controlling amplifier (G.C.A.)

The DC voltage which has been rectified with the detecting circuit is converted into a DC current and it is added to the constant current to be used to control the gain of the gain controlling amplifier. In addition, the feedback resistor is another controlling element of the gain controlling amplifier.
The expansion amount is increased or decreased by varying VR3.

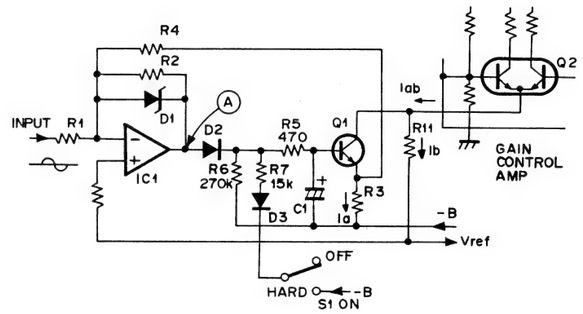


Fig. 9-2 Detecting circuit

■ Mixer

The output signals of the individual filter blocks (namely, LOW, MID and HIGH) are added and input with the mixer of the final stage.

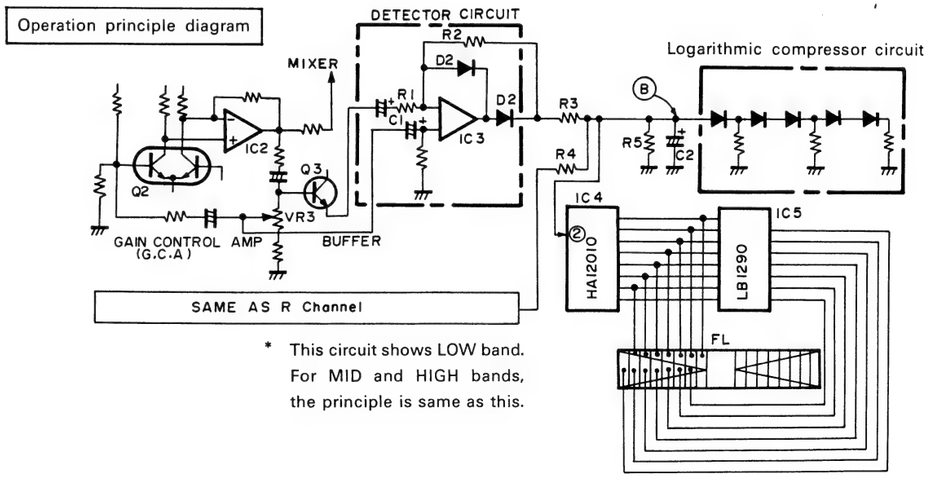


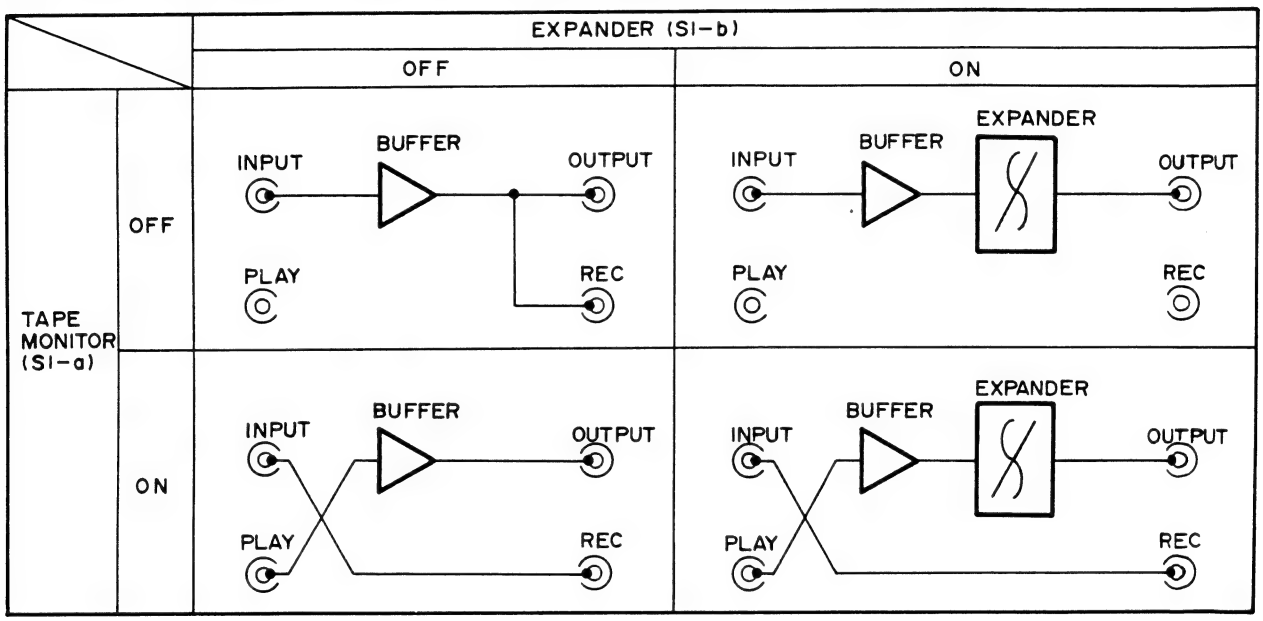
Fig. 9-3 Gain controlling amplifier and FL driving circuit

■ FL driving circuit

Extract a signal from the variable volume control VR3 which is the feedback resistor of the gain controlling amplifier, and it is detected and blended with the similarly detected outputs of other channels. Thus the blended signal drives the FL which displays the increased amount of the expansion.

1. The voltage obtained from the variable volume control VR3, which is positioned in the feedback section of the gain controlling amplifier, is amplified by the differential amplifier IC3. The detecting circuit of IC3 performs the same operation as that of IC1 described in the previous section.
2. The detecting outpus of both L and R channels are smoothed with C2 after they are being mixed by passing through R3 and R4, and furthermore, they are compressed logarithmically and converted into DC voltages (at point Ⓑ). The DC voltage obtained at point Ⓑ is input to pin 2 of IC HA12010 which drives the FL, and it drives HA12010 when white FL light is lit and drives LB1290 when red FL light is lit in response to the level at point B .

Convinations of tape monitoring switch (S1-a) and expander switch (S1-b)



10. ELECTRICAL PARTS LIST

NOTES:

- *When ordering resistors, first convert resistance values into code form as shown in the following examples.*

  Ex. 1 When there are 2 effective digits (any digit apart from 0), such as 560 ohm and 47k ohm (tolerance is shown by J=5%, and K=10%).

560Ω	*56 × 10¹*	*561*	*RD¼PS* 5 6 1	*J*
47kΩ	*47 × 10³*	*473*	*RD¼PS* 4 7 3	*J*
0.5Ω	*0R5*		*RN2H* 0 R 5	*K*
1Ω	*010*		*RS1P* 0 1 0	*K*

  Ex. 2 When there are 3 effective digits (such as in high precision metal film resistors).

5.62kΩ	*562 × 10¹*	*5621*	*RN¼SR* 5 6 2 1	*F*

- *The ⚠ mark found on some component parts indicates the importance of the safety factor of the part. Therefore, when replacing, be sure to use parts of identical designation.*
- *For your Parts Stock Control, the fast moving items are indicated with the marks ★★ and ★ .*

  ★★ GENERALLY MOVES FASTER THAN ★

  This classification shall be adjusted by each distributor because it depends on model number, temperature, humidity, etc.

Miscellaneous Parts

P.C.BOARD ASSEMBLIES

Mark	Symbol & Description	Part No.
	Control assembly	GWG-198
	AF assembly	GWK-261
	Complex assembly	GWM-416
	FL assembly	Non supply

OTHERS

Mark		Symbol & Description	Part No.
⚠	★★	S3 Push switch (POWER)	ASG-551
⚠	★	T1 Power transformer (120V)	ATS-209
⚠		C600 ceramic capacitor (0.01/125V)	ACG-502
⚠		AC Power cord	ADG-073
⚠		AC socket (AC OUTLET)	AKP-506

Control Assembly (GWG-198)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★	D504 LED	AEL-382
★	D501—D503 LED	AEL-424
★	D505	RD4.7EB (HZ4.7EB)
★★	Q501	2SA1115 (2SA933S)

SWITCHES

Mark	Symbol & Description	Part No.
★★	S1 Push switch (TAPE MONITOR, EXPANDER, HARD, SOFT)	ASG-828
★★	S2 Push switch (INPUT LEVEL)	SEA8V02L

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
★	VR1—VR3 Slide resistor (EXPANSION LEVEL)	ACX-140
	R508, R510	RD1/2PM471J
	R509	RD1/4PM122J
	Other resistors	RD1/8PM□□□J

AF assembly (GWK-261)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC2, IC5	NJM4558DXC
★	D100, D101	RD10EB (HZ10EB)
★	D102, D103, D113, D114	1SS131
★★	Q5	2SA1115 (2SA933S)
★★	Q102, Q103	2SC1845
★★	Q106, Q107	2SC2259

CAPACITORS

Mark	Symbol & Description	Part No.
	C110, C111	CCCSL050C50 (CCDSL050C50)
	C104, C105	CEANL2R2M50
	C108, C109	CEAS100M50
	C112, C113, C114, C115	CEAS221M16
	C106, C107	CEAS3R3M50
	C12	CEAS470M25

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	All resistors	RD1/8PM□□□J

Complex Assembly (GWM-416)

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC13—IC15	HA12010
★★	IC18	LB1290
★★	IC19	TC4066BP
★★	IC20	TC4069UBP
★★	IC1, IC3, IC4, IC6—IC11	NJM4558DXC
★★	Q6, Q7, Q51	2SA1115 (2SA933S)
★★	Q1	2SB750A
★★	Q100, Q101, Q200—Q205, Q300, Q301—Q303	2SC1845
★★	Q2—Q4	2SD836A
★★	Q50, Q52, Q104, Q105, Q206, Q207, Q304, Q305	2SC2603 (2SC1740S)
★★	Q53, Q54, Q108, Q210, Q308	2SC2878
★★	Q208, Q209, Q306, Q307	2SC2259
★	D51	KZL083
★	D200, D201, D300, D301	RD10EB (HZ10EB)
★	D8	RD16EB (HZ16EB)
★	D7	RD22EB (HZ22EB)
★	D13, D14	RD7.5EB (HZ7.5EB)
★	D9, D10	RD9.1EB (HZ9.1EB)
★	D3—D6	S5566
★	D11, D12, D50, D52, D53, D104—D112, D202—D214, D302—D312	1SS131
★	D1, D2	1S2471

CAPACITORS

Mark	Symbol & Description	Part No.
	C1 (0.01/AC150V)	ACG-019
	C214, C215, C310, C311	CCCSL050C50 (CCDSL050C50)
	C402, C403	CCCSL101J50 (CCDSL101J50)
	C16	CCCSL221J50 (CCDSL221J50)
	C400, C401	CEANL010M50
	C208, C209, C304, C305, C406, C407	CEANL2R2M50
	C318	CEASR68M50
	C6, C7, C9, C11, C51, C212, C213, C308, C309	CEAS100M50
	C5, C52	CEAS101M50
	C2, C3	CEAS102M50
	C404, C405	CEAS2R2M50
	C312—C315	CEAS220M25
	C50, C53	CEAS220M50
	C116, C117, C119, C120, C210, C211, C306, C307	CEAS3M50
	C13—C15, C17, C118, C216, C217, C218, C219	CEAS470M25
	C4, C8, C10	CEAS470M50
	C222	CEAS6R8M50
	C225, C226	CKCYB471K50 (CKDYD471K50)
	C227, C228	CKDYF103Z50
	C121, C122	CQMA103J50
	C206, C207	CQMA104J50
	C316, C317, C319, C320	CQMA153J50
	C102, C103	CQMA154J50
	C220, C221, C223, C224	CQMA184J50
	C202, C203, C302, C303	CQMA682J50

RESISTORS

NOTE: When ordering resistors, convert the resistance value into code form, and then rewrite the part no. as before.

Mark	Symbol & Description	Part No.
	R51	RD1/2PM152J
	R4, R13	RD1/2PM561J
	R50	RD1/4PM331J
	R5, R9, R11, R14, R24, R25, R57, R58	RD1/4PM□□□J
	R2, R3	RFA1/4PS100J
	R1, R6	RFA1/4PS4R7J
	R7, R8	RS2LMF470J
	Other resistors	RD1/8PM□□□J

OTHERS

Mark	Symbol & Description	Part No.
	Terminal (4P) (IN, OUT, TAPE)	AKB-094
	Screw 3x6	PBZ30P060FMC

FL Assembly

SEMICONDUCTORS

Mark	Symbol & Description	Part No.
★★	IC16, IC17	LB1290

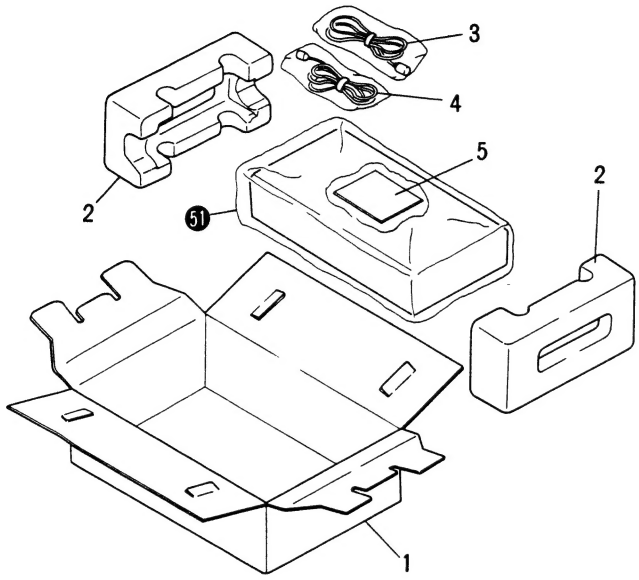
RESISTORS

Mark	Symbol & Description	Part No.
	R401	RD1/8PM103J

OTHERS

Mark	Symbol & Description	Part No.
	V1 Fluorescent indicator tube	AAV-034

11. PACKING



Parts List

Mark	No.	Part No.	Description
	1	AHE-524	Packing case (for [BK])
	2	AHA-376	Side pad
	3	ADE-072	Connector cord (with plug)
	4	ADE-073	Connector cord (with plug)
	5	ARB-687	Operating instructions (English)
	51		Vinyl sheet

12. FOR S AND S/G TYPES

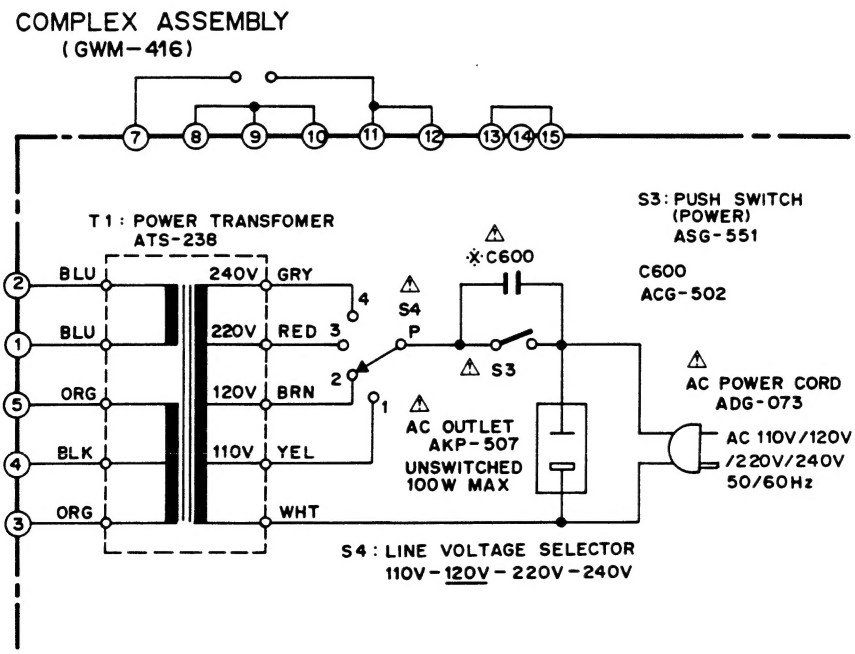
Model EX-9000/S and S/G types are the same as the EX-9000/KU with the exception of following sections.

Miscellaneous Parts

Mark	Symbol & Description	Parts No.			Remarks
		KU type	S type	S/G type	
⚠ ★	T1 Power transformer (120V)	ATS-209	.....	.....	
	T1 Power transformer (110V, 120V, 220V, 240V)	.....	ATS-238	ATS-238	
⚠	AC socket (AC OUTLET)	AKP-506	AKP-507	AKP-507	
⚠ ★★	S4 Line voltage selector	.....	AKX-502	AKX-502	
	Screw 3×8 (For line voltage selector)	.....	BBZ30P 080FZK	BBZ30P 080FZK	
	Packing case (For black type)	AHE-524	AHE-524	AHE-608	
	Packing case (For silver type)	.....	AHE-607	.....	
	Spacer (For packing)	.....	.....	AHB-148	

Circuit Diagram

S and S/G types



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ADDITIONAL

Service Manual

PIONEER

ORDER NO.
ARP-810-0

DYNAMIC EXPANDER

EX-9000(BK) HEM,HB

EX-9000 HEM,HB

- For servicing these types, please refer to the EX-9000 service manual (ARP-809) with the exception of this additional service manual.
- This additional service manual is applicable to the HEM and HB types.

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PIONEER ELECTRONICS AUSTRALIA PTY. LTD. 178-184 Boundary Road, Braeside, Victoria 3195, Australia
TEL: [03] 580-9911

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1. CONTRAST OF MISCELLANEOUS PARTS

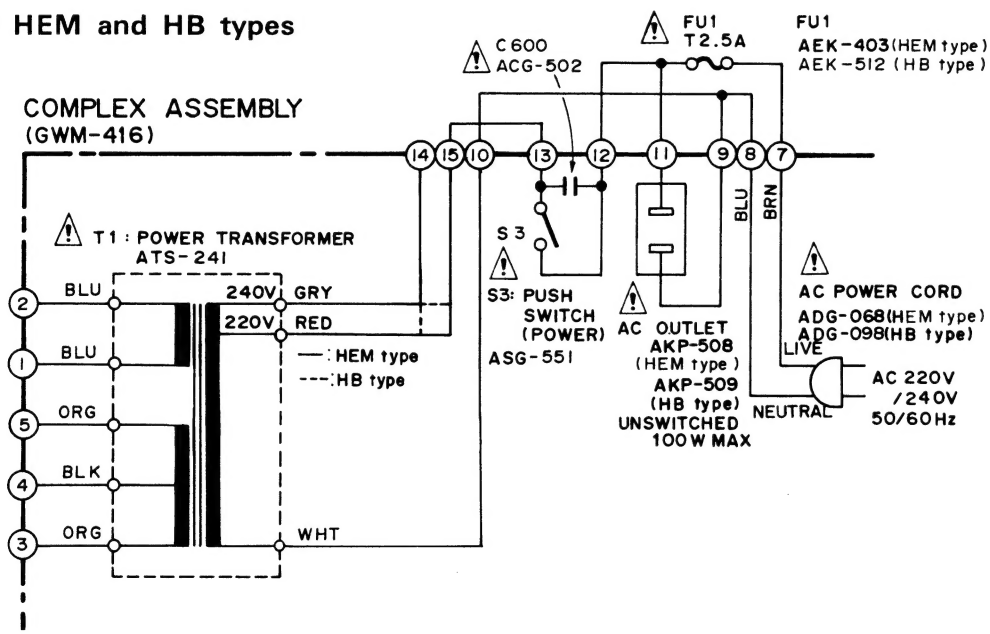
Model EX-9000 [BK]/HEM, HB, EX-9000/HEM and HB types are the same as the EX-9000 [BK]/KU type with the exception of following sections.

Miscellaneous Parts List

Mark	Symbol & Description	Part No.			Remarks
		KU type	HEM type	HB type	
⚠ ★	T1 Power transformer (120V) (220V/240V)	ATS-209	..... ATS-241	..... ATS-241	
⚠ ⚠	AC socket (AC OUTLET) AC power cord	AKP-506 ADG-073	AKP-508 ADG-068	AKP-509 ADG-098	
⚠ ★★	FU1 Fuse (T2.5A)	.....	AEK-403	AEK-512	
	Operating instructions (English) (English/German/French/ Italian)	ARB-687	..... ARE-154	ARB-687	

2. SCHEMATIC DIAGRAM

For HEM and HB types



Line Voltage Selection (For HEM and HB types)

Line voltage can be changed with following steps.

1. Disconnect the AC power cord.
2. Remove the Bonnet case.
3. Change the connection of the power transformer lead wire.
4. Stick the line voltage label on the rear panel.

Part No.	Description
AAX-193	220V label
AAX-192	240V label